



Original communication

Prevalence and medical risks of body packing in the Amsterdam area

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ABSTRACT

Aim: Body packing is a way to deliver packets of drugs across international borders by ingestion. The aim of the study was to provide an estimate of the medical risks of body packing, describe predictors for hospital referral in detained body packers and provide an estimate for the prevalence of body packing in the Amsterdam area.

Methods: From May 2007 to December 2008, we studied medical records of body packers immediately detained after arrival at Amsterdam Schiphol airport, hospital records of both detained body packers and self-referrers at two emergency departments of hospitals in Amsterdam and records kept by forensic physicians in charge of post-mortem examinations of all unnatural deaths in the area (years 2005–2009).

Results: In airport detainees, the hospital referral rate was 4.2% (30 out of 707 detained body packers), the surgery rate was 1.3%. Significant predictors of hospital referral were delayed production of drug packets after arrest, cigarette smoking and country of departure. The surgery rate in self-referrers was comparable to the rate observed in those referred from the detention centre to hospital (30% vs. 31%). In addition, from 2005 to 2009, 20 proven cases of lethal body packing were identified. Based on our data, it is estimated that minimally 38% of all incoming body packers were missed by airport controls.

Conclusion: The risk for lethal complications due to body packing is low on a population basis and comparable to other studies. This also applies for the hospital referral and surgery rates found in this study. Cigarette smoking has not yet been described in the literature as a potential predictor for hospital referral in detained body packers and therefore deserves attention in future research. A substantial fraction of body packers manages to remain undiscovered.

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1. Introduction

Body packing is a way to deliver packets of drugs across international borders by ingestion. The drugs might be transported in fingers of latex gloves, balloons or condoms, but most often are transported in industrially fabricated plastic pellets.¹ Drug packets

smuggled into European countries usually contain cocaine. During long-distance flights, body packers often use constipating agents to prevent the passage of drugs. Later on, laxatives are used to accelerate the passage of packets. The most common complications in body packing are acute intoxication and gastrointestinal problems caused by mechanical obstruction or perforation. Acute intoxication is caused by rupture or leakage of drug packets, leading to the 'body packer syndrome'.² Clinical symptoms depend on the drug ingested.³ In cocaine intoxication, dilated pupils, agitation, seizures, tachycardia, hypertensive crisis, hyperthermia, myocardial ischaemia and arrhythmias are observed. Physical struggle with law enforcement officials or ambulance staff can further enhance the cardiac effects of cocaine and lead to delirium and death.^{4,5} Risk

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factors for acute intoxication are poor quality of the drug packets,² the presence of wrapping material in faeces and the reingestion of drug packets since the repeated exposure to gastrointestinal fluids can render the packets more susceptible to rupture.^{6,7} Risk factors for gastrointestinal obstruction and perforation are gastrointestinal adhesions resulting from past laparotomy, the use of constipating agents and a large number of ingested packets.⁸ Body packers who are asymptomatic can be treated conservatively until the packets pass. Those showing signs of intoxication or gastrointestinal obstruction may require the immediate surgical removal of packets.^{9,10}

As many other Western countries, the Netherlands has struggled with the dramatic increase of body packing during the last decade. For this reason, in 2002, a medical–judiciary detention centre specialised in the assessment of body packers was established at the Amsterdam Airport Schiphol.¹¹ Medical care at this detention centre is provided by forensic physicians employed by the Amsterdam Public Health Service, in collaboration with custody nurses employed by the Ministry of Justice. At the detention centre, suspects are observed for development of complications until the packets are passed and followed by several packet-free stools. If indicated, suspects are referred to the emergency department of the Amsterdam-based VU University Medical Center (VUmc) for further diagnosis and treatment.

Despite all efforts undertaken in the recent years in the Netherlands, it is impossible to identify every body packer attempting to enter the country through controls at Schiphol airport. It thus can be expected that an unknown proportion of body packers successfully slips through controls. If complications arise in these smugglers, they might present at emergency departments, most probably in the Amsterdam area. Moreover, it can be expected that some body packers are not able to seek timely medical help in case of complications, with death as a consequence. This part of the population is brought to the attention of forensic physicians of the Amsterdam Public Health Service due to the unnatural character of these deaths. In Amsterdam, forensic physicians thus not only play a role in treating body packers, but also perform all external post-mortem examinations of lethal cases.

To provide an estimate of the medical risks of body packing and the prevalence of body packing in the Amsterdam area, the current study draws from registrations of different health-care providers. More specifically, the current study focusses on background characteristics and medical risks in three populations of body packers: (1) those detained immediately after arrival at Schiphol airport, (2) those presenting themselves to emergency departments with body packing-related complaints after having slipped through airport controls ('self-referrers') and (3) those whose death was confirmed by a forensic physician to have resulted from body packing. It is hypothesised that, in self-referrers, complications may be more serious due to delayed help seeking.

2. Methods

2.1. Study design

The study was performed based on the medical files of three patient populations, referred to as the 'airport detainees' (body packers incarcerated at Schiphol airport, subdivided into referrals and non-referrals), the 'self-referrers' (body packers who referred themselves to emergency departments) and the 'lethal cases' (Table 1). Next to background characteristics, predictors for hospital referral, type of complications and reasons for surgery were studied.

Table 1
Background characteristics of study populations.

	Airport detainees, total (n = 707)	Airport detainees referred to hospital (n = 30)	Self- referrers (n = 48)	Lethal cases ^a (n = 20)
Age (SD)	34.5 (9.7)	37.2 (9.6)	37.0 (10.8)	39.9 (11.8)
Male gender (%)	563 (79.6)	22 (73.3)	46 (95.8)	18 (90.0)

^a Three lethal cases occurred among the 707 airport detainees and one case among the 48 self-referrers.

2.2. Study population

The airport detainees are body packers arrested at Schiphol airport and detained at the airport-based detention centre. Immediately after arrest by the Royal Dutch Constabulary, every suspect is seen by a custody nurse for a medical intake. During this intake, a number of standard questions concerning risk factors for complications in body packing are recorded in the electronic registration system of the detention centre. Confirmation of body packing is established by an X-ray. For the purpose of this study, we included all proven body packers detained during May 2007 to March 2008 (n = 720). Next to ingesting drug packets, packets might be inserted in the rectum and/or vagina ('pushing'). After the exclusion of those who had not ingested, but exclusively 'pushed' drug packets (n = 13), the sample size available for analysis was 707. Among these 707 body packers, 32 had both ingested and pushed drug packets.

Self-referrers are patients with complaints related to the ingestion of drug packets who voluntarily attend the emergency department of one of the two academic hospitals in Amsterdam, the Academic Medical Center (AMC) and the VUmc. Apparently, these patients slipped through airport controls and sought help for medical problems related to body packing. At the VUmc emergency department, the study period covered the months from May 2007 to March 2008. At the AMC emergency department, data were available for the period from February 2007 to December 2008. In total, 48 self-referrers were identified.

Finally, all deaths from body packing in the Amsterdam area from January 2005 to December 2009 (n = 21) were analysed. These deaths were brought to the attention of forensic physicians employed at the Amsterdam Public Health Service. This service is in charge of performing external post-mortem examinations of all deceased persons in the wider Amsterdam area whose cause of death initially is considered unclear or unnatural. Depending on the outcomes of the external examination, a medico-legal autopsy may be performed by forensic pathologists of the Netherlands Forensic Institute (NFI). To include only proven cases of body packing, the autopsy reports of suspected cases of body packing were reviewed.

The periods of investigation in the three study groups were slightly different due to practical reasons such as availability of electronic documentation and time spent waiting for approval of the study by the different partners contributing data. Unless otherwise specified, the whole sample per group was analysed.

2.3. Analysis

For the statistical comparison of groups, Student's *t*-tests (continuous variables) and chi-square tests (discrete variables) were performed. All analyses were performed using Statistical Package for Social Sciences (SPSS) 17.0 for Windows. Missing values were handled using the pairwise method.

3. Results

One of the research questions concerns predictors of hospital referral in airport detainees. In our univariate analyses, country of departure significantly influences the likelihood of hospital referral, with body packers who depart from the Netherlands Antilles being significantly over represented among hospital referrals and those who depart from Africa being significantly underrepresented (Table 2). Next to this, body packers who produce packets immediately after arrest and non-smokers are significantly less likely to be referred. Other predictors do not influence hospital referral significantly, although some findings point to the expected direction (e.g. reingestion of drug packets and past laparotomy).

Signs of bowel obstruction (abdominal pain, vomiting, bloating, constipation and diarrhoea) were more commonly registered in self-referrers than in those referred by the airport detention centre (Fig. 1). Signs of intoxication, were more frequently noted in self-referrers. About 10% of the self-referrers were documented to have no complications; among those referred by the airport detention centre this number was 23% (statistical comparisons were non-significant). One death occurred among self-referrers due to massive aspiration of stomach contents. Complications such as gastrointestinal perforation were absent in both populations.

In total, six patients were transferred to other hospitals (five self-referrers and one patient from the airport cohort). For these patients, it was unknown whether they required surgery and whether they survived ('lost to follow-up'). When calculating the percentage of surgery in both groups treated in hospital, the denominator in self-referrers was therefore reduced from 48 to 43 patients in self-referrers and from 30 to 29 in patients referred from the airport (Table 3). Among the airport detainees, the surgery rate was 1.3% (9 surgery cases out of 706 cases with valid data; not in the table). Surgery was equally performed in self-referrers and in airport detainees. There were nine surgery cases among the 29 patients with valid data referred from the airport, and 13 surgery cases among the 43 self-referrers with valid data (31% vs. 30%, see Table 3). Among airport detainees, surgery was necessary due to

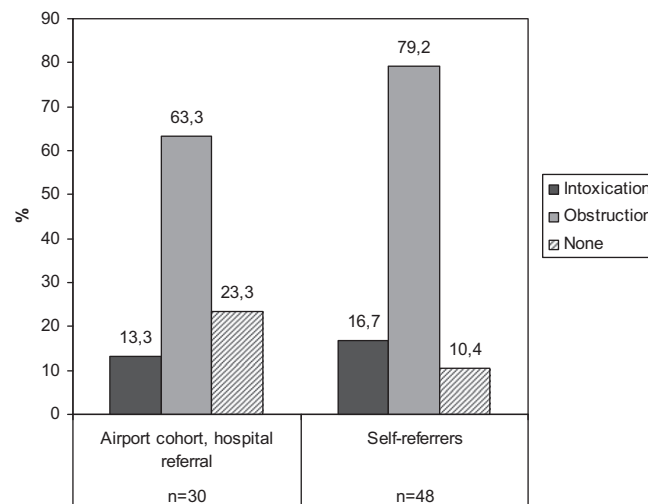


Fig. 1. Type of complications according to hospital records. Percentages exceed 100% in self-referrers due to the occurrence of both intoxication and obstruction in 3 cases; in addition one death occurred among self-referrers due to massive aspiration of gastric contents (not in figure).

intoxication in four cases, in self-referrers in seven cases. Five self-referrers were operated due to ileus (zero in airport detainees). In two cases, a very poor quality of drug packets was the reason for surgery (one self-referrer and one airport detainee). In one patient, packets had remained longer than 8 days in the stomach, necessitating surgery. In three airport detainees, the reasons for surgery could not be reconstructed from the hospital record.

Finally, we studied all lethal cases of body packing in the wider Amsterdam area from 2005 to 2009. In total, 21 body packers were identified (19 males, two females; average age 39.6 years). Country of birth was unknown in six cases, Suriname in three cases, Africa in seven cases, Latin America in two cases, Middle East in one case and the Netherlands in two cases. In six cases, the external post-mortem examination by the forensic physician was performed in hospital (one of these six in-hospital deaths was referred from the detention centre to hospital). Three bodies were examined in a public space, five in apartment buildings, two were examined at the detention centre, four were found dead at the airport and one died during the flight. Among self-referrers, one lethal case occurred, among airport detainees three lethal cases. In one death occurring in hospital, it was unclear whether the patient was a self-referrer or referred from the airport detention centre. In 19 cases,

Table 2
Predictors of hospital referral in airport detainees.^a

	Airport detainees, total (n = 707)	Hospital referral (n = 30)	No hospital referral (n = 677)
Age (SD)	34.5 (9.7)	37.2 (9.6)	34.4 (9.6)
Male gender (%)	563 (79.6)	22 (73.3)	541 (79.9)
Country of departure (%)			
Suriname	379 (54.3)	15 (53.6)	364 (54.3)
Africa	135 (19.3)	1 (3.6)	134 (20.0)*
Latin-America	135 (19.3)	5 (17.9)	130 (19.4)
Netherlands Antilles	31 (4.4)	4 (14.3)	27 (4.0)
Middle-East	11 (1.6)	2 (7.1)	9 (1.3)*
Netherlands	4 (0.6)	0	4 (0.6)
USA	2 (0.3)	0	2 (0.3)
Western Europe	1 (0.1)	1 (3.6)	0
Number of drug packets (SD)	84.3 (33.0)	84.3 (29.1)	84.3 (33.1)
Immediate production of drug packets after arrest (%)	338 (56.7)	6 (26.1)	332 (57.9)**
Reingestion of drug packets during flight (%)	10 (1.8)	1 (5.6)	9 (1.7)
Past laparotomy (%)	94 (15.6)	5 (22.7)	89 (15.3)
Constipating agents (%)	303 (50.4)	10 (41.7)	293 (50.8)
Drug use (%)	119 (21.3)	6 (31.6)	113 (20.9)
Smoking (%)	326 (54.3)	16 (76.2)	310 (53.5)*

** $p < 0.01$; * $p < 0.05$ (chi-square test; comparison of hospital referral/no hospital referral).

^a Information on predictors for hospital referral was not available for 100% of all cases; percentages provided in the table refer to cases with non-missing data (pairwise method).

Table 3
Reasons for surgery according to hospital records.^a

	Airport cohort, hospital referral (n = 30)	Self-referrers (n = 48)
Lost to follow-up	1	5
Available for further analysis	29	43
No. with laparotomy (%)	9 (31%)	13 (30%)
Reasons for laparotomy		
Intoxication only	4	7
Ileus only	0	4
Both ileus and intoxication	0	1
Asymptomatic; very poor quality of packets	1	1
Asymptomatic; packets > 8 days in stomach	1	0
Unknown	3	0

^a Among the 22 patients with laparotomy, four patients underwent repeat laparotomies due to complications (two self-referrers, two patients from airport cohort). In the table, we describe reasons for the first laparotomy.

death occurred due to cocaine intoxication. In one case of a female patient reporting to have ingested more than 40 drug packets 7 days ago (self-referrer), reanimation was unsuccessful after massive aspiration of gastric contents. In another case, intact drug packets were found at forensic autopsy in a male patient from Suriname. According to the autopsy report, death was not related to body packing, but occurred due to myocardial infarction. As body packing probably co-occurred in this case, but did not cause death, we decided not to count this case as a lethal case of body packing. The number of body packing-related deaths therefore amounts to 20 cases from 2005 to 2009 (18 males, two females; average age 39.9 years; see Table 1).

Based on our results, an estimation of the overall prevalence of body packing in the wider Amsterdam area is possible. As described, data concerning the airport detainees were available for the period from May 2007 to March 2008, while data concerning self-referrers from February 2007 to December 2008. The overlap of both periods is 11 months (May 2007 to March 2008). During this period, 18 self-referrers were registered and 707 body packers detained at the airport (see Table 4). Given a rate of hospital referrals of 4.2% in airport detainees and knowing that during the 11-month period, 18 self-referrers sought medical attention due to complaints (including one lethal case), it can be concluded that at least 429 body packers slipped through airport controls in 11 months. This implies that 37.8% of all incoming body packers might have been missed by airport controls in this period.

4. Discussion

The rate of hospital referrals due to body packing in our study amounted to only 4.2% (30 out of 707 body packers referred to hospital). Further, the surgery rate among airport detainees was very low with a percentage of 1.3%. Moreover, during the study period at emergency departments, only one self-referrer died due to body packing. These findings are in line with the results of other airport-based cohort studies, reporting a mortality risk ranging from 0% to 1.4% and a surgery rate of 0.7–3.7%.^{1,6,7,12–18} In addition, the population studied here is comparable in age and gender with other research reports. As in other studies, body packers identified at Schiphol airport are predominantly young men.

Significant predictors of hospital referral were delayed production of drug packets after arrest, cigarette smoking and the country of departure. It is not surprising that delayed production of drug packets is increasing the risk for hospital referral. It can be assumed that easy passage of packets is related to a low risk for obstruction

and intoxication. Based on this principle, some authors argue in favour of purging asymptomatic packers to speed up the passage of packets, others warn of undesirable effects of purging.^{3,8} Another significant predictor for hospital referral was smoking. This is known to increase the amount of acid produced by the stomach. One could therefore assume that smokers are more at risk for body packing-related complications as stomach acid might render leakage of drug packets more likely. On the other hand, it should be taken into account that detained body packers who are smokers will not be able to smoke as much in detention as they are used to. It is known that smokers who smoke less than usual can develop constipation as a consequence. This could lead to an increased risk of obstruction of drug packets. The influence of smoking on body packing-related complications has not yet been described in the literature and therefore deserves further attention. The country of departure, finally, may be related to the quality of the packets. Body packers departing from particular countries will be connected to different criminal networks with a particular way of producing packets. We furthermore hypothesised that those slipping through airport controls and referring themselves to emergency departments would have more serious complaints than those incarcerated at the detention centre at Schiphol airport. This assumption was not supported by the hospital data since the surgery rate in self-referrers was comparable to the rate in those referred from the detention centre to the hospital.

Although the mortality risk from body packing seems to be low on a population basis, dead body packers were examined regularly by Amsterdam forensic physicians. As our study demonstrates, 20 fatal cases due to body packing were found in the wider Amsterdam area between 2005 and 2010. This is about half the number of deaths reported for New York City in another 5-year period (1996–2001).¹⁹ As in our sample, in the New York City study, intoxication was the leading cause of death. Another interesting result of the analysis of lethal cases in the Amsterdam area is that among the 15 cases with a known country of origin, seven originated from Africa. In those detained at the airport, only 19% departed from Africa. Although country of departure does not necessarily equal country of origin, this could mean that body packers who depart from Africa are more likely to slip through controls. As in the Netherlands the focus of controls at Schiphol airport initially was on 'high risk' flights from Aruba, Venezuela, Suriname and the Netherlands Antilles, it is not surprising that body packers departing from African countries manage to escape controls. It remains unexplained however why the hospital referral rate in those departing from Africa in our study was lower than in other groups.

Finally, we estimated that about 38% of all body packers arriving at Schiphol airport remained undiscovered. This figure is very likely an underestimation of the real figure. We included only two emergency departments in Amsterdam, meaning that the real number of self-referrers in the Amsterdam area probably is even higher. Next to the included hospitals, another Amsterdam emergency department is likely to receive cases of body packing due to its location. This is the centrally located Onze Lieve Vrouwen Gasthuis (OLVG) in the eastern part of the city where part of the Surinamese population lives. This emergency department indicated to have treated approximately 5–10 body packers annually from 2004 to 2009. Although some cases of body packing might have been missed in our study, it can be assumed that the included emergency departments receive the vast majority of body packers. Detainees are generally referred to the VUmc, self-referrers are generally admitted at the Academic Medical Center situated in an area of Amsterdam where the majority of the Caribbean, Surinamese and African populations resides.

As every study, our research has weaknesses. First, a retrospective study depends on the quality of medical records. Absence of

Table 4
Estimation of the number of body packers who remained undiscovered by airport controls.

Known from this study	
A Number of body packers detained at airport between May 2007 to March 2008	707
B Referred from airport to hospital between May 2007 to March 2008	30
C Percentage of body packers detained at airport with hospital referral between May 2007 to March 2008, whereas $C = (B * 100)/A$	4.2
D Number of self-referrers between May 2007 to March 2008 ^a	18
Estimation	
E Hypothetical percentage of patients referring themselves to hospital between May 2007 to March 2008, whereas $E = C$	4.2
F Estimated number of undiscovered body packers between May 2007 to March 2008, whereas $F = (D * 100)/E$	429
G Estimated population of body packers, whereas $G = A + F$	1136
H Percentage of body packers who remained undiscovered between May 2007 to March 2008, whereas $H = (F/G) * 100$	37.8

^a Between February 2007 and December 2008, 30 patients referred themselves to hospital including one case with a lethal outcome; this number decreases to 18 self-referrers if the same time window is chosen as in airport controls.

information in hospital records regarding reasons for consultation can mean two different things: either the patient did not suffer from certain complaints or the quality of the registration was low. This also counts for the medical records kept by the airport detention centre. As indicated, information on risk factors for hospital referral (as documented by the airport detention centre) was not available for 100% of all cases. With regard to the studied risk factors for hospital referral in airport detainees, differences between referrals and non-referrals should remain unaffected by this circumstance, since there is no reason to assume differential underreporting in one of the two groups. Underreporting may also have an impact on the number of body packing-related deaths occurring out of hospital as community physicians might not call in a forensic physician because they fail to recognise the unnatural manner of death in these cases. The number of out-of-hospital deaths in particular therefore might represent an underestimation of the real figure. Another limitation is the lack of systematic information on the quality of drug packets in the medical records of both the airport detention centre and the hospitals. According to the literature, quality of packets is one of the most crucial predictors for complications, as badly wrapped drugs are more likely to cause intoxication.² Finally, the power in our statistical comparisons was low due to the relatively small number of patients seen in hospital during the studied period. Recommendations for further research therefore would be to extend the study period to increase the sample size and therefore the statistical power. Next to this, the quality of drug packets as a predictor for complications and hospital referral should be measured. In addition, the influence of gastric acid on the wrapping material with respect to duration of exposure needs to be examined. Finally, the potential role of smoking in complications in body packing deserves further investigation.

5. Conclusion

Although the inflow of body packers may fluctuate during the years, and the success of measures to identify body packers at the airport may vary in time, our study indicates that a substantial fraction of body packers leaves the airport without being discovered. This study therefore is not only informative to forensic physicians and hospital staff working in the proximity of international airports, but also to policy makers who are in charge of controlling the inflow of body packers.

Conflict of interest

There is no conflict of interest, none of the authors or the authors' institutions have a financial or other relationship with other people or organizations that may inappropriately influence the authors' work.

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Ethical approval

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